(12) UK Patent Application (19) GB (11) 2 168 612 A

(43) Application published 25 Jun 1986

(21) Application No 8432457

(22) Date of filing 21 Dec 1984

(51) INT CL⁴
A61F 13/16

(52) Domestic classification (Edition H):
A5R PF PG

(56) Documents cited
WO A1 83/04178 US 4195634 US 3587579

(58) Field of search
A5R
Selected US specifications from IPC sub-class A61F

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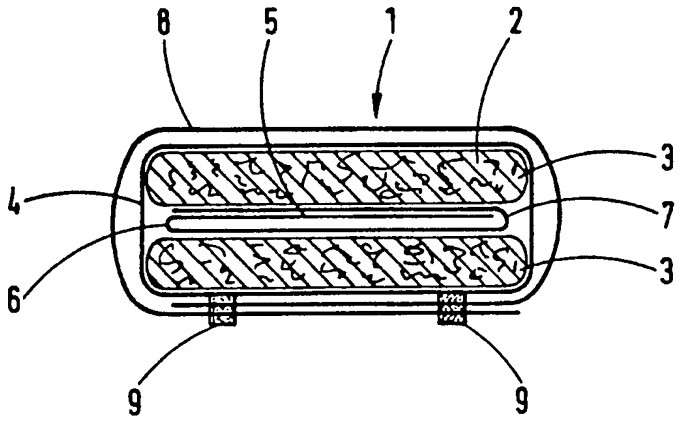
(54) Sanitary towel with resilient insert

(57) A sanitary towel (1) which comprises an absorbent core (2) and a resilient member (5) positioned within the core or adjacent to the face of the core which inhibits permanent distortion of the towel in use is characterised in that the resilient member comprises a resilient strip of flexible liquid pervious material which strip has lontitudinal folds which render the strip resilient in its lateral direction and processes for its preparation are described.



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The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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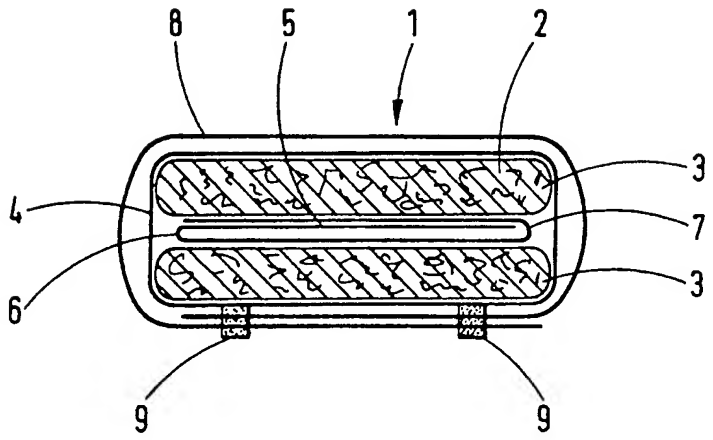

SPECIFICATION

Sanitary product

The invention relates to sanitary towels comprising a resilient strip, and processes for their preparation.

Conventional sanitary towels normally comprise an absorbent core containing for example hydrophilic fibres such as comminuted fluff wood pulp fibres. A sanitary towel prior to use is normally positioned between the wearer's legs, adjacent to the perineal area of the body and therefore in use the towel is likely to be subjected to forces generated by movement of the wearer,s legs. These forces, which include compressive and shearing forces, tend to act on the longitudinal side edges of the towel which normally deforms locally to accommodate these forces. Conventional sanitary towels containing absorbed body fluid exudate, however, generally have a low resistance to deformation and poor resiliency properties. Such towels in use therefore are usually permanently distorted to a "bunched" or "waisted" shape by the deformation forces generated by the wearer. Permanent distortion of the towel in use may undesirably reduce the surface area and absorbent capacity of the towel, increase the possibility of body fluid leaking over or past the side edges of the towel and also render the towel uncomfortable to wear. In addition, permanent distortion of the towel may induce in the wearer a feeling of insecurity which can lead to the towel being changed more often than is necessary. It is therefore desirable that the towel possesses some resiliency to enable it to resist permanent distortion in use.

United States Patent No. 4,195,634 discloses a sanitary napkin having adhesive disposed on its garment facing side which comprises an absorbent core, a sheet of liquid impervious material covering the bottom face of the towel and a stiffening layer positioned between the core and the liquid impervious material. This patent further explains that the stiffening layer has sufficient resiliency and stiffness to resist side compression of the napkin in use to aid retaining of the adhesive in place on a garment. Such a sanitary napkin thus possesses a resilient layer which resist permanent distortion of the napkin in use. However, such a resilient layer, which has sufficient stiffness to resist side compression of the napkin in use, may also render the napkin stiff and uncomfortable to wear.

British Patent No. 1,250,027 discloses a sanitary towel which has an elastically deformable member within the absorbent body of the towel and which is placed against the wearer in a prestressed upwardly curved position so that in use the side edges of the towel spread in sealing engagement with adjacent portions of the body. The elastic member of this towel which would be in a curved state within a prestress d towel, however, needs to exert sufficient elastic force to deform the towel in use. In order to provide such an elastic force it is highly likely that the elastic member would have to be either a thick material for example a foam which would render the towel excessively bulky or a thin relatively stiff material which would render the towel excessively stiff and uncomfortable to wear.

It has now been found that a sanitary towel can be provided with a resilient member to inhibit permanent distortion in use which does not render the towel excessively bulky or stiff so that it is uncomfortable to wear.

Accordingly, the present invention provides a sanitary towel which comprises an absorbent core and a resilient member positioned within the core or adjacent to a face of the core which inhibits permanent distortion of the towel in use characterised in that the resilient member comprises a resilient strip of flexible liquid pervious material which strip has two longitudinal folds which render the strip resilient in its lateral direction.

The folds are normally and preferably at the longitudinal edges of the folded strip.

The material used for the resilient strip will normally be a thin sheet material. Suitable flexible, liquid pervious sheet materials can be any of such sheet materials which then folded will form a fold with a resilient "spring like" property. The resilient strip used in the invention thus has two such longitudinal resilient "spring like" folds at opposed longitudinal edges of the folded strip which render the strip resilient in at least its lateral direction. The resilient strip preferably, comprises, a material which will maintain this resilient "spring like" fold property when contacted with aqueous liquids such as body fluid exudates.

Suitable materials for use in the resilient strip include non-woven fabrics and plastics nets comprising water insoluble fibre forming polymers. Suitable polymers include polyolefines, such as polypropylene, propylene-ethylene copolymers and high density polyethylene, polyamides and polyesters.

Preferred materials for use in the resilient strip are plastics nets.

The term net when used herein means structure in which the ribs, filaments or strands are formed integrally with the junctures, for example during manufacture.

Plastics nets for use in the invention can suitably have a set of parallel ribs in one direction. Such nets can be folded in a direction which is transverse to the rib direction to provide a fold with a resilient "spring like" property.

Favoured nets have a set of parallel ribs in one direction which intersect with a set of parallel ribs in a second direction. Preferably the two sets of ribs intersect at right-angles

to form, for example net with a pattern of square or rectangular apertur s.

The thickness, weight per unit area of the net and rib frequency in any one direction of the plastics net should be adapted to provide the net when folded transversely to the rib direction with a resilient spring-like fold.

The thickness of the plastics net can suitably be 0.1mm to 0.5mm and can preferably be 0.15mm to 0.3mm.

The weight per unit area of the plastics net can suitably be 20 to 70g/m² and can preferably be 30 to 60g/m². The number of ribs per cm in any one direction can suitably be 2 to 40 and can preferably be 4 to 25.

Suitably plastics nets for use in the invention are disclosed in British Patent Nos. 1,110,015 1,075,487 and 1,427,281.

Apt nets for use in the invention are polyolefine nets known as Net 909, reference No. GS 310, KS 325A, GS 110, and T8 available from Smith & Nephew Plastics Limited.

Preferred nets for use in the invention are GS 310 and T8.

GS 310 is a polypropylene net which has weight per unit area of approximately 48g/m²; a thickness of approximately 0.2 mm and 5 ribs per cm in one direction and 9 to 11 ribs per cm in the transverse direction.

T8 is a polypropylene net hwich has a weight per unit area of approximately 47g/m², a thickness of approximately 0.2mm and 6 ribs per cm in one direction and 23 ribs per cm in the transverse direction.

The resilient strip can have any suitable folded configuration which provides folds at the longitudinal edges of the folded strip. Suitable folded configurations include configurations in which the longitudinal edge portions of the strip are folded to overlie the same face of the strip so that the edge portions are spaced apart, meet or overlap. Other suitable folded configurations include configurations in whichthe longitudinal edge portions of the strip are folded to overlie the opposite faces of the strip for example in a flattened 'z' configuration, in which the strip is in the form of a flattened tube and in which the strip is in the form of a flattened roll of more than one convolution for example two convolutions to provide the strip two-layer longitudinal folds.

Favoured resilient strips of the invention have a folded configuration in which the longitudinal edge portions of the strip are folded to overlie the same face of the strip and also overlap to form a folded strip with for example three layers of similar width.

The resilient strip can advantageously comprise a composite strip of two or more layers of flexible liquid pervious material. One of these layers, however, must be a material of the type described hereinbefore which will form a spring-like resilient fold when folded.

A resilient strip which comprises a composite strip consisting of two layers of material which will form a resilient fold, for example two layers of plastics net, will have two longitudinal two-layer resilient springlike folds. Such a resilient strip therefor will be more resilient and have a higher resistance to deformation in its lateral direction than a resilient strip formed from a single layer of material.

The composite strip, however, can comprise a layer or layers which can advantageously provide the resilient strip with another function. Favoured resilient strips of the invention comprise a composite strip in which one layer is a flexible liquid pervious absorbent layer, for example a tissue paper wadding. Such a resilient strip when used within the absorbent core of a sanitary towel of the invention can act as a fluid spreading layer to distribute absorbed fluid exudate over a wider area of the absorbent core, thereby increasing the absorbent capacity of the towel.

The resilient strip can optionally be provided with an insert layer within folded layers of the strip, such as an absorbent layer, which can act as a fluid spreading layer within the absorbent core of the towel in use.

The resilient strip of the invention provides the resilient member which is positioned within the core or adjacent to a face of the core of the sanitary towel of the invention and inhibits permanent distortion thereof in use. The resilient member will normally be positioned adjacent to the non-body face of the core or within the core of the sanitary towel. It is preferred, however, that resilient member is positioned within the absorbent core. The resilient strip should be positioned so that it extends in the longitudinal direction of the towel so that is longitudinally folds are adjacent to at least a central portion of the longitudinal side edges of the towel. The resilient strip so positioned can render at least the central portion of the length of the towel resilient in its width direction and thereby inhibit permanent distortion of the towel in use. It is preferred however that the resilient strip extends substantially the length of the absorbent core to render the towel resilient in its width direction over the whole of its length.

Desirably the resilient strip extends over at least 90% of the width of the core to provide the towel adequate lateral resiliency to obtain a good recovery from distortion in use. However, it is preferred that the resilient strip has a slightly less or similar width to that of the absorbent core so that the longitudinal folds of the strip are close to the longitudinal side edges of the towel.

The absorbent core of the sanitary towel of the invention can comprise any of the conventional absorbent fibrous materials such as cellulosic fibres conventionally used for sanitary towels. Favoured absorbent cores conveniently comprise two layers of such absorbent fibres between which the resilient strip is positioned. The absorbent core can optionally be con-

tained within a wrapper for example of tissue paper wadding t prevent loss of fibres.

The non-body facing side of the absorbent core can optionally be provided with a conventional fluid impermeable barrier layer for example a thin polyethylene film which can also cover the side edges of the core.

The absorbent core of the sanitary towel of the invention will normally have an outer cover layer or wrapper of soft liquid pervious material to prevent contact of the absorbent core with the wearer's skin. Suitable cover layers or wrappers can be any of those soft cover layers or wrappers conventionally used for sanitary towels.

Such a cover layer of wrapper will normally also cover the resilient strip which is within the core or adjacent to a face of the core and therefore prevent contact of the resilient strip with the wearer's skin.

The sanitary towel of the invention can be provided on its non-body facing surface with adhesive for example a pair of longitudinal strips of adhesive to enable the towel to be adhered to a supporting garment. Preferably, the adhesive penetrates the cover layer to adhere it to an underlying layer which can be a fluid impervious barrier layer, the resilient strip or the absorbent core.

In a further aspect, the invention provides a process for preparing the sanitary towel of the invention which comprises providing a resilient member within the absorbent core or adjacent to a face of the absorbent core of the sanitary towel to inhibit permanent distortion thereof in use characterised in that the resilient member comprises a resilient strip of flexible liquid pervious material which strip has two longitudinally folds which render strip resilient in its lateral direction.

Suitable materials for use in the process of the invention can be those described hereinbefore in relation to the sanitary towel of the invention.

The resilient strip used in the invention can be prepared by folding a suitable flexible, liquid pervious sheet strip into the required configuration by any convenient method to provide the strip with two longitudinally folds.

The process of preparing the sanitary towel of the invention can be a conventional process for preparing a sanitary towel in which the resilient strip is positioned within or adjacent to a face of the absorbent core.

A preferred process of the invention comprises inserting the resilient strip between two layers of absorbent material, for example two batts of comminuted fluff wood pulp. The absorbent layers containing the resilient strip can then be wrapped, for example in a tissue paper wadding to inhibit fibre loss. The absorbent core so formed can be provided with an outer cover layer wrapper by conventional methods to form the sanitary towel of the invention.

The invention will now be illustrated by the following drawing in which Figure 1 is a diagrammatic cross section of a sanitary towel of the invention.

Figure 1 shows a sanitary towel (1) which comprises an absorbent core (2), consisting of two absorbent layers (3) within a wrapper (4), and resilient strip (5) within the absorbent core (2). The resilient strip (5) consists of a strip of flexible liquid pervious material, typically a plastics net, which has two longitudinal folds (6, 7) which are located at the longitudinal edges of the folded strip (5). Sanitary Towel (1) has an outer cover (8) in the form of a wrapper, the overlapping edge portions of which are adhered to the absorbent core (2) by pressure sensitive adhesive strips (9) which penetrate overlapping cover layers.

The resilient folded strip (5) shown in Figure 1 has a width which is slightly less than the width of the absorbent core layers (3) so that its folds (6,7) are close to the longitudinal edges of the towel (1) to provide the towel (1) with good resiliency, but are covered by the wrapper (4) and the outer cover layer (8) to render these edges soft and non-abrasive.

The two longitudinally folds of the resilient strip provide the strip with resilient spring-like folds at opposed edges which render the strip resilient in at least the lateral direction of the strip. The resilient strip therefore after being deformed by forces acting across the width of the strip, for example compression forces generated by the wearer of the sanitary towel, will tend to recover its shape after these deformation forces have been removed. The resilient strip thus provides the sanitary towel of the invention with a resilient member which can in use aid the towel to recover its shape and thus inhibit permanent distortion thereof. Further more, the flexible nature of the materials used in the resilient strip do not render the sanitary towel of the invention uncomfortable to wear. In addition, the presence of the resilient strip within the absorbent core of the towel can reinforce the absorbent material used therein and thus inhibit break up of the core in use.

Example 1

Preparation of a Resilient Strip of the Invention

A strip (length 216mm, width 183mm) of plastics net (polypropylene net reference GS 310 available from Smith and Nephew Plastics Limited) was folded longitudinally so that the folded edge portions of the sheet overlapped on the same face of the sheet to form a resilient strip of the invention. The resilient strip so formed had three layers of similar width and two longitudinally folds which rendered the strip resilient in its lateral direction.

The net used in the preparation of the resilient strip had a weight per unit area of 48 g/m², a thickness of 0.2mm, and 5 ribs per cm in one direction and 10 ribs per cm in the

transverse direction.

Preparation of a Sanitary Towel of the Invention

The folded strip resilient strip prepared above was inserted between two fluff pulp layers (216mm × 63mm) which was then wrapped with a slow absorbent tissue wadding to form the absorbent core of a sanitary towel. The absorbent core was then wrapped in a non-woven fabric cover wrapper (spun bonded polypropylene fabric known as Lutravil VP 605 available from Lutravil Spinnvlies) the overlapping edges of which were secured to the core by two spaced parallel strips of pressure sensitive adhesive, which were provided with individual protector strips, to form the sanitary towel of the invention.

Example 2

A resilient strip was formed by folding in the same manner as Example 1, using a composite strip consisting of a layer of plastics net of Example 1 and a layer of two ply tissue wadding strip. The resilient strip so formed had the layer of net on the outside surfaces of the strip.

A sanitary towel was thenformed in the same way as Example 1 using the resilient strip prepared above.

Examples 3 and 4

Sanitary towels of the invention were prepared in the same manner as Examples 1 and 2 using a resilient strip formed from polypropylene net (Ref. T8 available from Smith and Nephew Plastics Limited) instead of polypropylene net Ref. GS 310.

The net used in the preparation of the resilient strips had a weight per unit area of 47 g/m², a thickness of 0.21mm and 6 ribs per cm in one direction and 23 ribs per cm in a transverse direction.

Examples 5 and 6

Sanitary towels of the invention were prepared in the same manner as Examples 1 and 2 using a resilient strip formed from a polypropylene net Ref. KS 325A (available from Smith & Nephew Plastics Limited) instead of net Ref. GS 310.

The net used in the preparation of the resilient strips had a weight per unit area of 30 g/m². a thickness of 0.2mm and 6 ribs per cm in one direction and 7 ribs per cm in a transverse direction.

Examples 7 and 8

Sanitary towels of the invention were prepared in the same manner as Examples 1 and 2 using a resilient strip formed from a polypropylene Ref. GS 110 (available from Smith and Nephew Plastics Limited) instead of net Ref. GS 310.

The net used in the preparation of the resilient strips had a weight per unit area of 57 g/m², a thickness of 0.25 mm and 4 ribs per cm in one direction and 4 ribs per cm in a transverse dir ction.

Resiliency Test

Sanitary towels prepared in Examples 1 to 8 were tested by the following procedure.

7m1 of a methyl cellulose (Natrasol 250M) solution having a viscosity of 8-9 cps was dropped onto the central portion of a test towel and allowed to absorb for 1 minute. The towel was then positioned on its side between two pairs of projecting supports mounted on a platform of Instron 1195 testing apparatus. A metal bar (7.5cm long, 1cm wide with a 0.5cm radius surface edge) mounted transverse to the towel was then pushed into the side edge of the towel at a speed of 200mm per minute to a depth of 4 cm to deform the towel in the width direction at a central position thereof and then removed in a reverse operation to allow the towel to recover.

This cyclic deformation of the towel was repeated until 15 cycles had been completed. The difference in distance between the onset of loading for the 1st and 15th cycles was then recorded and expressed as a percentage (D) of the original width of the towel. The smaller the value of D, the more resistant the towel is to permanent deformation.

Results

Sanitary Towel Example No.	*D* *
1	23
2	23
3	24
4	24
5	28
6	28
7	33
8	33
Comparison Sanitary Towel	45

The comparison towel was a sanitary towel similar to that of Example 2 except that the resilient strip was ommitted. The comparison sanitary towel had a construction similar to that of known commercial prior art towels which do not comprise a resilient strip of the invention.

The results show that sanitary towels of the invention which comprise a resilient strip within the absorbent core of the towel have much less permanent distortion under width compression than sanitary towels without such a resilient strip.

The results thus indicate that the resilient strip within the absorbent core of the sanitary towel of the invention would inhibit permanent distortion of these towels in use.

CLAIMS

1. A sanitary towel which comprises an absorbent core and a resilient member positioned within the core or adjacent to a face of the core which inhibits permanent distortion of the towel in use characterised in that the resilient member comprises a resilient strip of flexible liquid pervious material which strip has two longitudinal folds which render the strip resilient in its lateral direction.

2. A sanitary towel as claimed in claim 1 in which the resilient strip is positioned within the absorbent core of the sanitary towel.

3. A sanitary towel as claimed in claim 2 in which the absorbent core comprises two layers of absorbent material and the resilient strip is positioned between the two layers.

4. A sanitary towel as claimed in any one of claims 1 to 3 in which the resilient strip extends substantially the length of the absorbent core.

5. A sanitary towel as claimed in any one of claims 1 to 4 in which the resilient strip has a width which is the same or slightly less than that of the absorbent core.

6. A sanitary towel as claimed in any one of claims 1 to 5 in which the folded longitudinal edge portions of the resilient strip overlie the same face of the strip.

7. A sanitary towel as claimed in any one of claims 1 to 6 in which the resilient strip comprises a plastics net.

8. A sanitary towel as claimed in claim 7 in which the plastics net comprises polyolefine.

9. A sanitary towel as claimed in either of claims 7 and 8 in which the plastics net comprises two insecting sets of parallel ribs.

10. A sanitary towel as claimed in claim 9 in which the two sets of parallel ribs intersect at right angles to each other.

11. A sanitary towel as claimed in any one of claims 7 to 10 in which the plastics net has a thickness of 0.15mm to 0.8mm.

12. A process for the preparation of a sanitary towel of any one of claims 1 to 11 which comprises providing a resilient member within the absorbent core or adjacent to a face of the absorbent core of the sanitary towel to inhibit permanent distortion thereof in use characterised in that the resilient member comprises a resilient strip of flexible liquid pervious material which strip has longitudinal folds which render the strip resilient in its lateral direction.

Printed in the United Kingdom for
Her Majesty's Stationery Office, Dd 8818935, 1986, 4235.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.